Claims

1. Method for determining specific conditions or changes in the endometrium or in the epithelium of other organs wherein RNA is isolated from a blood sample and/or tissue sample and in this sample a quantitative measurement of the expression or over expression of the mRNA of β7-hCG and/or β6-hCG and/or β6e-hCG is carried out.

2. Method according to claim 1, characterized in that in addition a quantitative measurement of total βhCG mRNA expression or of the mRNA expression of β5-hCG and/or β8-hCG and/or β3-hCG is carried out and brought into relation with the mRNA expression of β7-hCG and/or β6-hCG and/or β6e-hCG.

3. Method according to claim 1 or 2, characterized in that the quantitative measurement of the mRNA expression is realized by means of quantitative RT-PCR or real-time RT-PCR.

4. Method according to claim 3, characterized in that, based on the cDNA obtained by reverse transcriptase (RT) total β-hCG cDNA is amplified in the first PCR step with at least one first primer pair, wherein the first primer pair hybridizes with cDNA of β5-hCG, β8-hCG, β3-hCG as well as β7-hCG and β6-hCG and β6e-hCG, and in a subsequent second PCR step the cDNA of β7-hCG and/or β6-hCG and/or β6e-hCG is specifically amplified with at least one third primer, wherein the third primer specifically hybridizes with cDNA of β7-hCG and β6-hCG and β6e-hCG, but not with cDNA of β5-hCG, β8hCG, and β3-hCG.

Method according to claim 4, characterized in that in the second PCR step additionally the cDNA of β5-hCG and/or β8-hCG and/or β3-hCG is specifically amplified with at least one fourth primer, wherein the fourth primer hybridizes specifically with the cDNA of β5-hCG, β8-hCG and β3-hCG

but not with cDNA of β7-hCG and β6-hCG and β6e-hCG

5. Method according to claim 4 or 5, characterized in that as a first primer pair oligonucleotides of the group of sequences according to SEQ ID NO. 1, SEQ ID NO. 2, SEQ ID NO. 11, and SEQ ID NO. 14 are used in the first PCR step and as a third primer an oligonucleotide of the group of sequences according to SEQ ID NO. 3, SEQ ID NO. 9, SEQ ID NO. 10, SEQ ID NO. 13, and SEQ ID NO. 16 is used in the second PCR step.

6. Method according to claim 5 or 6, characterized in that as a fourth primer an oligonucleotide of the group of sequences according to SEQ ID NO. 4, SEQ ID NO. 8, SEQ ID NO. 12, and SEQ ID NO. 15 is used in the second PCR step.

7. Method according to one of the claims 4 to 7, characterized in that at least one primer is fluorescence marked.

8. Method according to claim 8, characterized in that a primer of the first primer pair, the third primer and optionally the fourth primer are provided with fluorescence markers that differ from one another with regard to their adsorption and/or emission spectra.

9. Use of the method according to one of the claims 1 to 9 for prospective or retrospective diagnostic of an endometrial receptivity for implantation of an embryo.

10. Use according to claim 10, characterized in that peripheral blood or tissue of endometrium or cervix is removed from a female patient and the analysis of the mRNA expression is carried out in this blood or tissue sample and, based on the level of determined mRNA expression of β7-hCG and/or β6-hCG and/or β6e-hCG, conclusions in regard to the receptivity of the uterus for an embryo in the actual cycle are drawn.

11. Use according to claim 10, characterized in that the analysis of the mRNA expression is carried out in a sample of menstrual blood of a female patient and, based on the level of the determined mRNA expression of β7-hCG and/or β6-hCG and/or β6e-hCG in the past cycle, prognoses of the potential receptivity of the uterus for an embryo in the subsequent cycle are made.

12. Use of the method according to one of the claims 1 to 9 for tumor diagnosis.

13. Use according to claim 13, characterized in that, for detecting uterine carcinoma, tissue is removed from the endometrium or cervix of a female patient and the analysis of mRNA expression is carried out in this tissue sample.

14. Use according to claim 13 or 14, characterized in that the values of the mRNA expression in the tumor tissue are compared to the values of the mRNA expression in healthy tissue.

15. Use according to one of the claims 13 to 15, characterized in that the value of the promoter expression of β5-hCG and/or β8-hCG and/or β3-hCG is determined and is preferably divided by the mRNA expression of total βhCG and, based on the value of the thus obtained quotient, conclusions in regard to the degree of malignancy of the tumor are drawn.

16. Primer sequence according to SEQ ID NO. 3 or SEQ ID NO. 4 or one of the SEQ ID NO. 8 to SEQ ID NO. 16.

17. Diagnostic kit for determining specific conditions or changes in the uterus by quantitative RT-PCR containing, respectively, an amount of:

    a) oligo-dT,

    b) enzyme reverse transcriptase,

    c) at least two primers hybridizing with cDNA of β7-hCG and/or β6-hCG and/or β6e-hCG wherein at least one of the two

primers does not hybridize with β5-hCG and/or β8-hCG and/or β3-hCG,

d) a DNA polymerase resistant above 80 °C,

e) reaction buffer.

18. Diagnostic kit according to claim 18, characterized in that it contains a first primer pair that hybridizes with cDNA of β5-hCG, β8-hCG, β3-hCG as well as β7-hCG and β6-hCG and β6e-hCG, and a third primer that hybridizes specifically with cDNA of β7-hCG and β6-hCG and β6e-hCG but not with cDNA of β5-hCG, β8-hCG, β3-hCG.

19. Diagnostic kit according to claim 18 or 19, characterized in that it contains a fourth primer that hybridizes specifically with cDNA of β5-hCG, β8-hCG, and β3-hCG but not with cDNA of β7-hCG and β6-hCG and β6e-hCG.

20. Diagnostic kit according to claim 19, characterized in that it contains an amount of a primer pair selected from the group of sequences according to SEQ ID NO. 1, SEQ ID NO. 2, SEQ ID NO. 11 and SEQ ID NO. 14 of a third primer selected from the group of sequences according to SEQ ID NO. 3, SEQ ID NO. 9, SEQ ID NO. 10, SEQ ID NO. 13, and SEQ ID NO. 16.

21. Diagnostic kit according to claim 20, characterized in that it contains an amount of a fourth primer selected from the group of sequences according to SEQ ID NO. 4, SEQ ID NO. 8, SEQ ID NO. 12, and SEQ ID NO. 15.

22. Diagnostic kit according to one of the claims 18 to 22, characterized in that at least one primer is fluorescence marked.

23. Diagnostic kit according to claim 23 characterized in that a primer of the first primer pair, the third primer and optionally the fourth primer are provided with fluorescence markers that differ from one another with regard to their adsorption and/or emission spectra.

24. Diagnostic kit according to one of the claims 18 to 24, characterized in that it contains a defined amount of mRNA or cDNA of β5-hCG and/or β7-hCG as a standard.

25. Use of the diagnostic kit according to one of the claims 18 to 25 for prospective or retrospective diagnostic of endometrial receptivity for implantation of an embryo.

26. Use of the diagnostic kits according to one of the claims 18 to 26 for tumor diagnosis.

27. Variant β6e of the β6 gene or β7 gene having a nucleic acid sequence according to SEQ ID NO. 7 and/or coding for a protein with the amino acid sequence according to SEQ ID NO. 17 or SEQ ID NO. 18.

28. Use of a gene sequence according to claim 28 and/or SEQ ID NO. 5 and/or SEQ ID NO. 6 as a marker for prospective or retrospective diagnostic of endometrial receptivity for implantation of an embryo.

29. Use of a gene sequence according to claim 26 and/or SEQ ID NO. 5 and/or SEQ ID NO. 6 as a marker for tumor diagnostic.

30. Use of the gene sequences SEQ ID NO. 1 to SEQ ID NO. 16 with or without fluorescence marker conjugation for the quantitative measurement of gene expression of β5-hCG and/or β8-hCG and/or β3-hCG and/or β7-hCG and/or β6-hCG and/or β6e-hCG with the methods of real-time RT-PCR for prospective or retrospective diagnostic of endometrial receptivity for implantation of an embryo and for tumor diagnostic.